

Reference Standards

Clinical, Forensic & Toxicology

Blood Alcohol
Exempted Drugs of Abuse
Explosives
Fire Debris Analysis
Personal Care Products
Weathered Petrochemical



Blood Alcohol

Blood Alcohol Standards (Control)

Use to verify the retention time for each compound normally included in a blood alcohol test and to verify that the compounds are resolved from and do not interfere with one another.

Blood Alcohol Mix Resolution Control Standard

(8 components)

Acetaldehyde (75-07-0)	Ethyl acetate (141-78-6)
Acetone (67-64-1)	2-Propanol (Isopropanol) (67-63-0)
Acetonitrile (75-05-8)	Methanol (67-56-1)
Ethanol (64-17-5)	Methyl ethyl ketone (78-93-3)

0.100 g/dL each in water, 1 mL/ampul

cat.# 36256 (ea.)

BAC Resolution Control Standard n-P (6 components)

• Includes 1-propanol internal standard.

• Intended for qualitative use only.

Acetaldehyde (75-07-0)	Methanol (67-56-1)
Acetone (67-64-1)	1-Propanol (<i>n</i> -Propanol) (71-23-8)
Ethanol (BAC) (64-17-5)	2-Propanol (Isopropanol) (67-63-0)

100 mg/dL each in water, 1 mL/ampul

cat.# 36010 (ea.)

No data pack available.

BAC Resolution Control Standard t-B (6 components)

• Includes *tert*-butanol internal standard.

• Intended for qualitative use only.

Acetaldehyde (75-07-0)	Ethanol (BAC) (64-17-5)
Acetone (67-64-1)	Methanol (67-56-1)
<i>tert</i> -Butanol (TBA) (75-65-0)	2-Propanol (Isopropanol) (67-63-0)

100 mg/dL each in water, 1 mL/ampul

cat.# 36011 (ea.)

No data pack available.



Get Fast, Definitive Data for Blood Alcohol Testing

Rtx®-BAC Plus 1 and Rtx®-BAC Plus 2 Columns & Standards

- Optimized column selectivities.
- Robust and reproducible column chemistry.
- 2-minute analysis time.
- Product line also features resolution control standards.

See **page 65** for columns.

www.restek.com/BACPlus



Formulated and produced by our team of veteran chemists, 50,000+ batches of highly stable and accurate reference standards have left our facility over the last 20+ years.

Exempted Drug of Abuse

Exempted Drug of Abuse

Exempted Drug of Abuse Reference Standards

Concentration is µg/mL. Volume is 1 mL/ampul.

Compound	CAS #	Solvent	Conc.	cat.#
Benzodiazepines				
Alprazolam	28981-97-7	PTM	1,000	34042
Bromazepam	1812-30-2	PTM	1,000	34043
Chlordiazepoxide	438-41-5	PTM	1,000	34044
Clobazam	22316-47-8	PTM	1,000	34045
Clonazepam	1622-61-3	PTM	1,000	34046
Diazepam	439-14-5	PTM	1,000	34047
Flunitrazepam	1622-62-4	PTM	1,000	34049
Flurazepam	1172-18-5	PTM	1,000	34050
Lorazepam	846-49-1	PTM	1,000	34051
Nitrazepam	146-22-5	PTM	1,000	34053
Oxazepam	604-75-1	PTM	1,000	34054
Prazepam	2955-38-6	PTM	1,000	34055
Temazepam	846-50-4	PTM	1,000	34056
Triazolam	28911-01-5	PTM	1,000	34057
Cocaine & Metabolites				
Cocaehtylene	529-38-4	ACN	1,000	34066
Cocaine	53-21-4	PTM	1,000	34015
Benzoylcegonine	519-09-5	PTM	1,000	34016
Ecgonine	5796-31-6	PTM	1,000	34017
Ecgonine methyl ester	38969-40-3	PTM	1,000	34018
Methadone & Metabolites				
EDDP perchlorate	66729-78-0	M	1,000	34069
Methadone	1095-90-5	PTM	1,000	34005
Amphetamines & Metabolites				
d-Amphetamine	51-63-8	PTM	1,000	34020
(+)-Methamphetamine	51-57-0	PTM	1,000	34021
3,4-MDA HCl	4764-17-4	M	1,000	34070
3,4-MDEA HCl	82801-81-8	M	1,000	34072
3,4-MDMA HCl	64057-70-1	M	1,000	34071
Opiates & Metabolites				
Codeine	76-57-3	PTM	1,000	34000
Dextromethorphan HBr monohydrate	6700-34-1	M	1,000	34081
Hydrocodone	34195-34-1	PTM	1,000	34002
Hydromorphone	71-68-1	PTM	1,000	34063
Morphine	6211-15-0	PTM	1,000	34006
Oxycodone	124-90-3	PTM	1,000	34007
Oxymorphone	76-41-5	PTM	1,000	34065
Cannabinoid & Metabolites				
Cannabichromene (CBC)	20675-51-8	PTM	1,000	34092
Cannabidiol (CBD)	13956-29-1	PTM	1,000	34011
Cannabidiolic Acid (CBDA)	1244-58-2	ACN	1,000	34094
Cannabigerol (CBG)	25654-31-3	PTM	1,000	34091
Cannabinol (CBN)	521-35-7	PTM	1,000	34010
Δ ⁹ -Tetrahydrocannabinol (THC)	1972-08-3	M	1,000	34067
(±)11-nor-9-carboxy-Δ ⁹ -THC	104874-50-2	M	100	34068
Barbiturates				
Amobarbital	64-43-7	PTM	1,000	34028
Aprobarbital	77-02-1	PTM	1,000	34029
Barbital	57-44-3	PTM	1,000	34030
Butabarbital	125-40-6	PTM	1,000	34031
Butalbital	77-26-9	PTM	1,000	34032
DL-Glutethimide	18389-24-7	PTM	1,000	34058
Hexobarbital	56-29-1	PTM	1,000	34033
Mephobarbital	115-38-8	PTM	1,000	34034
Methohexital	151-83-7	PTM	1,000	34035
Pentobarbital	76-74-4	PTM	1,000	34036
Phenobarbital	50-06-6	PTM	1,000	34037
Secobarbital	29071-21-4	PTM	1,000	34038
Talbutal	115-44-6	PTM	1,000	34039

Compound	CAS #	Solvent	Conc.	cat.#
GHB				
1,4-Butanediol	110-63-4	M	1,000	34078
γ-Butyrolactone (GBL)	96-48-0	ACN	1,000	34077
α-Methylene-γ-butyrolactone (AMGBL)	547-65-9	ACN	1,000	34079
γ-Valerolactone	108-29-2	ACN	1,000	34080
Other				
Benzphetamine	5411-22-3	PTM	1,000	34022
Caffeine	58-08-2	M	1,000	34084
Cotinine	486-56-6	M	1,000	34086
Fentanyl	437-38-7	M	1,000	34082
nor-Fentanyl oxalate	1609-66-1	M	1,000	34083
Levorphanol	5985-38-6	PTM	1,000	34003
Meperidine	50-13-5	PTM	1,000	34004
Meprobamate	57-53-4	PTM	1,000	34059
Methaqualone	340-56-7	PTM	1,000	34064
Methyprylon	125-64-4	PTM	1,000	34060
Nicotine	54-11-5	M	1,000	34085
Pentazocine	64024-15-3	PTM	1,000	34062
Phencyclidine	956-90-1	PTM	1,000	34027
Phendimetrazine	50-58-8	PTM	1,000	34025
Phenmetrazine	1707-14-8	PTM	1,000	34026
Phentermine	1197-21-3	PTM	1,000	34024
Dextro-propoxyphene	1639-60-7	PTM	1,000	34008
Thebaine	115-37-7	PTM	1,000	34009

ACN = acetonitrile; M = methanol; PTM = purge-and-trap grade methanol

Forensic Drug Screen Test Mixture (8 components)

Amiodarone (19774-82-4)	10 µg/mL	Diazepam (439-14-5)	10
Amphetamine (51-63-8)	10	Doxepine (1229-29-4)	10
Caffeine (58-08-2)	10	Haloperidol (52-86-8)	1
Codeine (76-57-3)	10	Morphine (6211-15-0)	10

In P&T methanol, 1 mL/ampul

cat.# 36340 (ea.)

Forensic Drug Screen Internal Standard Solution 1 rev A (2 components)

Diazepam-d5
D5-doxepine

10 µg/mL each in P&T methanol, 10 mL/ampul

cat.# 36341 (ea.)

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Line of Certified
Reference
Materials



See pages 464-465.

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Explosives

Single-Component Explosives Solutions

- Supports U.S. Department of Defense base closures and remediation.
- Mixtures and singles supporting LC U.S. EPA Method 8330.
- Mixtures and singles supporting GC-ECD U.S. EPA Method 8095.
- Internal standards and surrogates to support both methods.

These materials support nitroaromatic, nitramine, and nitro-ester analyses by GC-ECD (Method 8095).^{1,2} Compounds listed are explosives, manufacturing intermediates, or degradation products. Method 8095 mixtures contain the components at concentration ratios appropriate for ECD.

Volume is 1 mL/ampul. Concentration is µg/mL.

Compound	CAS #	Solvent	Conc.	cat.#
4-Amino-2,6-dinitrotoluene	19406-51-0	ACN	1,000	31671
3,5-Dinitroaniline	618-87-1	ACN	1,000	31661
1,2-Dinitrobenzene	528-29-0	M	1,000	31453
1,3-Dinitrobenzene	99-65-0	ACN	1,000	31662
2,4-Dinitrotoluene	121-14-2	ACN	1,000	31663
2,6-Dinitrotoluene	606-20-2	ACN	1,000	31664
3,4-Dinitrotoluene	610-39-9	M	1,000	31452
EGDN*	628-96-6	M	1,000	31601
HMX*	2691-41-0	ACN	1,000	31665
Nitrobenzene	98-95-3	ACN	1,000	31657
Nitroglycerin*	55-63-0	M	1,000	31498
Nitroguanidine*†	556-88-7	M	1,000	31602
2-Nitrotoluene	88-72-2	ACN	1,000	31659
3-Nitrotoluene	99-08-1	ACN	1,000	31660
4-Nitrotoluene	99-99-0	ACN	1,000	31658
PETN (pentaerythritol tetranitrate)*	78-11-5	M	1,000	31600
Picric acid*	88-89-1	M	1,000	31499
RDx*	121-82-4	ACN	1,000	31666
Tetryl*	479-45-8	ACN	1,000	31667
1,3,5-Trinitrobenzene*	99-35-4	ACN	1,000	31668
2,4,6-Trinitrotoluene*	118-96-7	ACN	1,000	31669

ACN = acetonitrile; M = methanol

* Ships under Restek's USDOT explosives approval.

† Available only to customers or distributors inside the 48 contiguous United States; item may not be resold for export.

References (Not available from Restek)

¹U.S. Environmental Protection Agency. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. SW-846, Proposed Draft Update IVB, Office of Solid Waste, Washington, DC, 1999.

²M. E. Walsh, T. Ranney, J. Chromatogr. Sci., Vol. 36, pp. 406-416, August 1998.

Fire Debris Analysis (ASTM E1387 and E1618)

These materials also can be used for underground storage tank monitoring.

E1387 Column Resolution Check Mix (13 components)

<i>n</i> -Hexane (C6) (110-54-3)	<i>n</i> -Eicosane (C20) (112-95-8)
<i>n</i> -Octane (C8) (111-65-9)	2-Ethyltoluene (611-14-3)
<i>n</i> -Decane (C10) (124-18-5)	3-Ethyltoluene (620-14-4)
<i>n</i> -Dodecane (C12) (112-40-3)	Toluene (108-88-3)
<i>n</i> -Tetradecane (C14) (629-59-4)	1,2,4-Trimethylbenzene (95-63-6)
<i>n</i> -Hexadecane (C16) (544-76-3)	<i>p</i> -Xylene (106-42-3)
<i>n</i> -Octadecane (C18) (593-45-3)	

2,000 µg/mL each in methylene chloride, 1 mL/ampul

cat.# 31224 (ea.)

E1618 Test Mix (13 components)

Components in this mix (0.5 µL/mL or 0.05% volume/volume each) are at 10x the concentration of the final test solution specified in ASTM 1618 and ASTM 1387.

<i>n</i> -Hexane (C6) (110-54-3)	<i>n</i> -Eicosane (C20) (112-95-8)
<i>n</i> -Octane (C8) (111-65-9)	2-Ethyltoluene (611-14-3)
<i>n</i> -Decane (C10) (124-18-5)	3-Ethyltoluene (620-14-4)
<i>n</i> -Dodecane (C12) (112-40-3)	Toluene (108-88-3)
<i>n</i> -Tetradecane (C14) (629-59-4)	1,2,4-Trimethylbenzene (95-63-6)
<i>n</i> -Hexadecane (C16) (544-76-3)	<i>p</i> -Xylene (106-42-3)
<i>n</i> -Octadecane (C18) (593-45-3)	

0.05% volume/volume each in methylene chloride, 1 mL/ampul

cat.# 31613 (ea.)

No data pack available.

please note

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Compound Index for Reference Standards

See pages 586-592.



Personal Care Products

Ethylene Oxide Standards

- The industry's only suite of off-the-shelf reference standards for detecting ethylene oxide and 1,4-dioxane in PEG-based products.
- Formulated with concentrations needed by labs analyzing cosmetics and personal care products for possible carcinogens.
- Quantitatively tested to confirm composition; detailed support documentation provided.
- Certified reference material (CRM) manufactured and QC-tested in Restek's ISO-accredited labs satisfies your ISO requirements.

Ethylene Oxide/1,4-Dioxane Standard

(2 components)

1,4-Dioxane (123-91-1)
Ethylene oxide (75-21-8)

0.001% w/w each in PEG-400, 5 mL/ampul

cat.# 30546 (ea.)



Ethylene Oxide/Acetaldehyde Standard

(2 components)

Acetaldehyde (75-07-0)
Ethylene oxide (75-21-8)

0.001% w/w each in PEG-400, 5 mL/ampul

cat.# 30547 (ea.)



Ethylene Oxide Standard

Ethylene oxide (75-21-8)

0.005% w/w in PEG-200, 5 mL/ampul

cat.# 30548 (ea.)



PEG-200 Standard

Poly (ethylene glycol) 200 (25322-68-3)

Neat, 10 mL/ampul

cat.# 30549 (ea.)



PEG-400 Standard

Poly (ethylene glycol) 400 (25322-68-3)

Neat, 10 mL/ampul

cat.# 30559 (ea.)



Weathered Petrochemical

Weathered Petrochemical Standards

These solutions are prepared from a single-source (one-refinery) product. The weathered materials indicate the percent weight loss from the original material. Samples of regular- and premium-grade unleaded gasoline were collected, then blended in equal volumes.

There are four general types of mineral spirits, classified according to boiling point range (BPR):

- Type I (Stoddard solvent) BPR 149–182 °C
- Type II (high flash point) BPR 177–196 °C
- Type III (odorless) BPR 149–196 °C
- Type IV (low dry point) BPR 149–174 °C

Stoddard Solvent Standard

Stoddard solvent is also known as Type I mineral spirits, Texsolve S, or Varsol® 1 mineral spirits. We offer this reference material for those who need to calibrate Stoddard solvent separately. This standard is dissolved in methanol for analysis by either direct injection or purge-and-trap.

Stoddard solvent (8052-41-3)

10,000 µg/mL in P&T methanol, 1 mL/ampul

cat.# 30487 (ea.)

We prepare our mineral spirit solutions from an equal-volume blend of Type I, II, and III mineral spirits.

Concentration is µg/mL. Volume is 1 mL/ampul.

Compound	CAS #	Solvent	Conc.	cat.#
Unleaded gasoline: unweathered	8006-61-9	PTM	5,000	30096
Unleaded gasoline: 25% weathered	8006-61-9	PTM	5,000	30097
Unleaded gasoline: 50% weathered	8006-61-9	PTM	5,000	30098
Unleaded gasoline: 75% weathered	8006-61-9	PTM	5,000	30099
Unleaded gasoline: 99% weathered	8006-61-9	PTM	5,000	30436
Kerosene	CAS #	Solvent	Conc.	cat.#
Kerosene: unweathered	84742-81-0	D	5,000	31229
Kerosene: 25% weathered	84742-81-0	D	5,000	31230
Kerosene: 50% weathered	84742-81-0	D	5,000	31231
Kerosene: 75% weathered	84742-81-0	D	5,000	31232
Diesel Fuel #2	CAS #	Solvent	Conc.	cat.#
Diesel fuel #2: unweathered	68334-30-5	D	5,000	31233
Diesel fuel #2: 25% weathered	68334-30-5	D	5,000	31234
Diesel fuel #2: 50% weathered	68334-30-5	D	5,000	31235
Diesel fuel #2: 75% weathered	68334-30-5	D	5,000	31236
Mineral Spirits	CAS #	Solvent	Conc.	cat.#
Mineral spirits: unweathered	8030-30-6	D	5,000	31225
Mineral spirits: unweathered	8030-30-6	D	50,000	31260

D = methylene chloride

PTM = purge-and-trap grade methanol

Weathered Petrochemical, *cont.*

Weathered Gasoline Kit

These solutions are prepared from a single-source (one-refinery) product. The weathered materials indicate the percent weight loss from the original material. Samples of regular- and premium-grade unleaded gasoline were collected, then blended in equal volumes.

Contains 1 mL each of these mixtures.

30096: Unleaded Gasoline Standard

30097: Unleaded Gasoline Standard: 25% Weathered

30098: Unleaded Gasoline Standard: 50% Weathered

30099: Unleaded Gasoline Standard: 75% Weathered

cat.# 30100 (kit)

kit

Weathered Gasoline Kit #2

These solutions are prepared from a single-source (one-refinery) product. The weathered materials indicate the percent weight loss from the original material. Samples of regular- and premium-grade unleaded gasoline were collected, then blended in equal volumes.

Contains 1 mL each of these mixtures.

30096: Unleaded Gasoline Standard

30097: Unleaded Gasoline Standard: 25% Weathered

30098: Unleaded Gasoline Standard: 50% Weathered

30099: Unleaded Gasoline Standard: 75% Weathered

30436: Unleaded Gasoline Standard: 99% Weathered

cat.# 30437 (kit)

kit

Weathered Kerosene Kit

These solutions are prepared from a single-source (one-refinery) product. The weathered materials indicate the percent weight loss from the original material.

Contains 1 mL each of these mixtures.

31229: Kerosene Standard

31230: Kerosene Standard: 25% Weathered

31231: Kerosene Standard: 50% Weathered

31232: Kerosene Standard: 75% Weathered

cat.# 31238 (kit)

kit

Weathered Diesel Fuel #2 Kit

These solutions are prepared from a single-source (one-refinery) product. The weathered materials indicate the percent weight loss from the original material.

Contains 1 mL each of these mixtures.

31233: Diesel Fuel #2 Standard

31234: Diesel Fuel #2 Standard: 25% Weathered

31235: Diesel Fuel #2 Standard: 50% Weathered

31236: Diesel Fuel #2 Standard: 75% Weathered

cat.# 31239 (kit)

kit



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Columns in Both Fused Silica & Metal

See page 116.

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